

A new species of *Paracimex* (Hemiptera: Cimicidae): the first avian bug from the Ethiopian Region

by

JOHN A. LEDGER & ANNALIE KRITZINGER

Department of Entomology, South African Institute
for Medical Research, Johannesburg

Paracimex africanus spec. nov. is described from the nests of two species of swifts, *Tachymarptis melba africanus* (Temminck) and *T. aequatorialis gelidus* Brooke (Aves: Apodidae) in the Transvaal and Rhodesia respectively. The new species is differentiated from the 12 *Paracimex* known from Southeast Asia and the Pacific Islands, and comments are made on the supraspecific classification of its hosts.

In his monograph on the Cimicidae, Usinger (1966) says "Interesting gaps are the . . . lack of bird bugs of any kind in the Ethiopian Region and in Central America". We report here the discovery of the first avian bug from Africa south of the Sahara, belonging to the genus *Paracimex* Kiritshenko. Usinger (1966) described and illustrated the 10 species of *Paracimex* then known and provided a key. Ueshima (1968a) described two further species and in another paper (Ueshima, 1968b) discussed distribution, host relationships and speciation in *Paracimex*. The description that follows is based on specimens mounted in canada balsam on glass microscope slides. All measurements are in millimetres and were made with an ocular micrometer. A figure in parenthesis following a statement of range represents the mean. Line drawings were prepared with the aid of a projection microscope; micrographs were made from specimens ultrasonically cleaned, dehydrated in alcohol, vacuum coated with silver and viewed in a Cambridge Stereoscan S4 scanning electron microscope (SEM). Host nomenclature follows Brooke (1967, 1970, 1971, 1972).

***Paracimex africanus* spec. nov., figs 1-5**

FEMALE. General appearance and chaetotaxy in fig. 1. Head slightly longer than wide, ratio 1:1.05-1.21 (1.16); interocular space 6.6-8.1 (7.2) times as wide as eye. Proportions of antennal segments not constant (see Table 1). Rostrum reaches apices of procoxae.

Pronotum 1.98-2.69 (2.20) times as wide as long, 1.53-1.73 (1.62) times as wide as head; sides convex anteriorly, slightly convex posteriorly; longest bristles 1.13-0.84 (1.05) times as long as the 1st antennal segment. Bristles are conspicuously serrate; c. 35 bristles laterally on each side of the pronotum.

Mesonotum-scutellum with c. 10 prominent bristles posteriorly and a few minute setae medio-anteriorly.

Hemelytral pads 1.56-1.87 (1.71) times as wide as long; broadly rounded at the outer sides, anterior and posterior margins converging towards the median of the thorax.

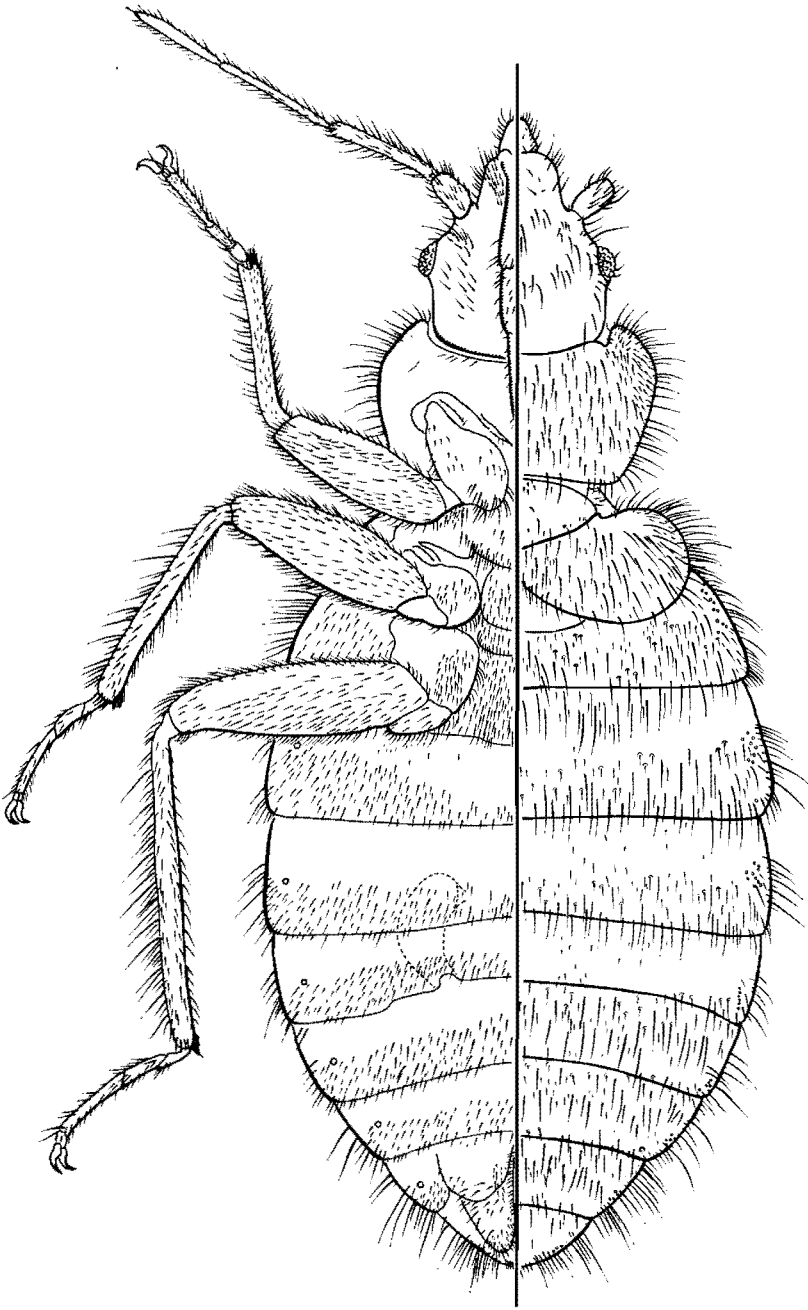


Fig. 1. *Paracimex africanus* spec. nov. Dorso-ventral view of female.

Front femora with clearly visible row of spines (fig. 2). Ctenidia of middle femora (fig. 3) are not easily identifiable as viewed with a light microscope, quite distinct when the SEM is used (see diagnosis). Ctenidia often reduced to just a few spines.

Hind femora 2,86–3,42 (3,16) times as long as wide; hind tibiae 1,27–1,36 (1,33) times as long as hind femora.

Abdominal segments with serrate bristles, minute setae and laterally on each tergite, a few sensilla.

Ectospermalege is a tubular structure arising from an inverted “U”-shaped sclerotized entrance (fig. 4) on the posterior margin of the 5th abdominal sternite, leaning slightly to the right before curving to the left; swollen out to the right side; with a funnel-shaped opening antero-laterally. The ectospermalege reaches well into the posterior half of the 4th abdominal segment.

MALE. No sexual dimorphisms occur.

The length of the paramere is 0,51–0,66 (0,56) of the base of the genital segment, reaching just beyond the middle of the left side of the genital segment. The base of the genital segment is always slightly longer than the left side. Paramere and genital segment as in fig. 5.

MATERIAL EXAMINED. HOLOTYPE. ♀ ex nest of *Tachymarptis melba africanus*, Madikoto, Pietersburg district, Transvaal, South Africa. (P. Milstein, 2.xii.1972).

PARATYPES. 10♂, 9♀, same data as holotype.

ADDITIONAL MATERIAL. 6♂, 5♀ ex nest of *Tachymarptis aequatorialis gelidus*, Shotse, Matopos, Rhodesia. (R. K. Brooke, 10.x.1971).

The holotype and 7♂ 6♀ paratypes are deposited at the South African Institute for Medical Research, Johannesburg; 1♂♀ paratypes at the British Museum (Natural History), London; 1♂♀ paratypes at the United States National Museum, Washington; 1♂♀ paratypes at the University of California, Berkeley.

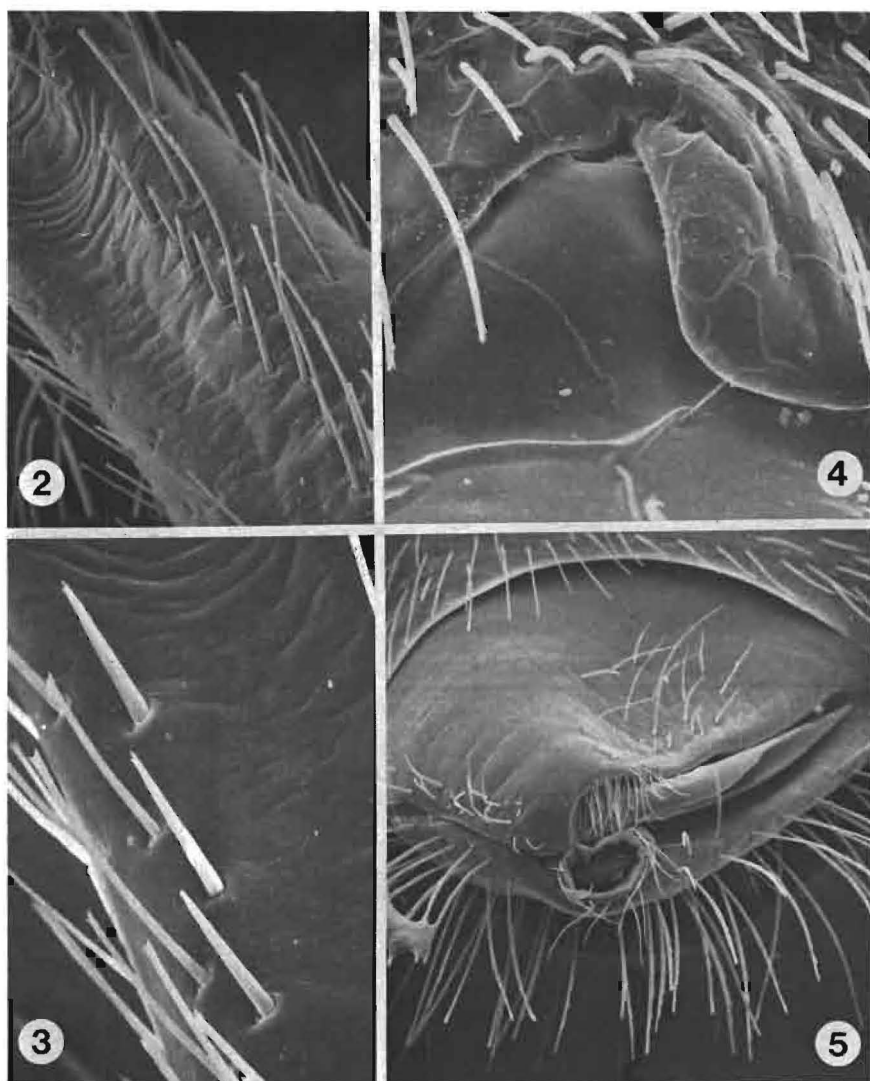
DIAGNOSIS

The above description is based on the population from *T. melba*, our material from this host being rather more plentiful and in better condition than that from *T. aequatorialis*. We have purposely excluded the latter population from the type series, since differences in several measurements can be found; however, we do not intend to place too much importance on these measurements since we have only seen one collection from each host. The details of all measurements made are contained in Table 1.

While our specimens clearly belong to the sub-family Cimicinae as defined by Usinger (1966), we were initially concerned about their generic position since we were unable to see the ctenidia of the middle femora in several specimens, the ctenidia of the front and middle femora being diagnostic for *Paracimex* (Usinger, 1966). However, with the aid of the SEM it has been possible to demonstrate that ctenidia are present, albeit in very reduced form, on both front and middle femora in *Paracimex africanus*, and this has led us to adopt the present generic placing. As illustrated in fig. 3, the “ctenidium” on the middle femur is hardly worthy of the name, consisting in this instance of only three setae which are short and stout in comparison with the

TABLE 1. Measurements (mm) of *Paracimex africanus* spec. nov. found in nests of *Tachymarptis melba* and *T. aequatorialis*. Ranges and means (in brackets) are given.

	<i>T. melba</i> nests		<i>T. aequatorialis</i> nests	
	(N = 10) females	(N = 10) males	(N = 5) females	(N = 6) males
Head:				
width . . .	0,80–0,95 (0,86)	0,81–0,93 (0,86)	0,76–0,88 (0,82)	0,74–0,93 (0,82)
length . . .	0,95–1,02 (0,98)	0,93–1,00 (0,96)	0,88–1,02 (0,97)	0,97–1,04 (0,99)
interocular space	0,72–0,83 (0,77)	0,72–0,81 (0,75)	0,59–0,74 (0,69)	0,66–0,80 (0,71)
width of eye . .	0,10–0,11 (0,11)	0,11–0,12 (0,11)	0,09–0,11 (0,10)	0,09–0,10 (0,09)
Antennae:				
total length . .	1,64–1,81 (1,76)	1,68–1,81 (1,75)	1,70–1,88 (1,78)	1,67–1,96 (1,82)
1st segment . .	0,21–0,26 (0,25)	0,23–0,25 (0,24)	0,20–0,24 (0,23)	0,22–0,26 (0,24)
2nd segment . .	0,53–0,58 (0,56)	0,54–0,60 (0,57)	0,53–0,59 (0,55)	0,55–0,60 (0,57)
3rd segment . .	0,47–0,53 (0,51)	0,47–0,52 (0,50)	0,51–0,57 (0,54)	0,52–0,60 (0,57)
4th segment . .	0,43–0,47 (0,45)	0,39–0,47 (0,44)	0,43–0,48 (0,46)	0,38–0,50 (0,44)
Rostrum:				
total length . .	1,10–1,23 (1,17)	1,14–1,26 (1,19)	1,11–1,24 (1,19)	1,14–1,23 (1,20)
1st segment . .	0,37–0,45 (0,40)	0,40–0,47 (0,43)	0,37–0,44 (0,41)	0,37–0,46 (0,43)
2nd segment . .	0,29–0,38 (0,34)	0,31–0,38 (0,35)	0,29–0,34 (0,32)	0,33–0,37 (0,35)
3rd segment . .	0,40–0,47 (0,43)	0,38–0,45 (0,41)	0,42–0,47 (0,45)	0,40–0,44 (0,42)
Pronotum:				
width . . .	1,33–1,49 (1,40)	1,35–1,47 (1,41)	1,23–1,40 (1,31)	1,26–1,45 (1,36)
length . . .	0,52–0,71 (0,63)	0,57–0,78 (0,67)	0,62–0,66 (0,63)	0,59–0,66 (0,63)
longest bristles .	0,21–0,29 (0,25)	0,25–0,31 (0,28)	0,34–0,38 (0,36)	0,35–0,42 (0,38)
Hemelytral pads:				
width . . .	0,81–0,93 (0,87)	0,83–0,93 (0,87)	0,78–0,93 (0,84)	0,81–0,88 (0,84)
length . . .	0,47–0,55 (0,50)	0,50–0,52 (0,52)	0,47–0,55 (0,51)	0,52–0,57 (0,54)
longest bristles .	0,23–0,29 (0,25)	0,22–0,35 (0,29)	0,31–0,32 (0,32)	0,35–0,39 (0,37)
Hind femur:				
width . . .	0,37–0,43 (0,39)	0,36–0,38 (0,37)	0,36–0,43 (0,39)	0,36–0,43 (0,38)
length . . .	1,16–1,23 (1,20)	1,19–1,26 (1,22)	1,21–1,30 (1,27)	1,28–1,33 (1,30)
Hind tibia:				
length . . .	1,49–1,66 (1,57)	1,54–1,64 (1,58)	1,64–1,80 (1,72)	1,71–1,82 (1,75)
Hind tarsus:				
length . . .	0,69–0,74 (0,71)	0,66–0,76 (0,72)	0,64–0,78 (0,74)	0,74–0,81 (0,76)
Abdomen:				
width . . .	2,47–2,73 (2,60)	2,49–2,75 (2,59)	2,39–2,75 (2,55)	2,30–2,68 (2,53)
length . . .	2,89–3,46 (3,20)	2,96–3,86 (3,38)	2,96–3,91 (3,45)	3,75–4,08 (3,86)
longest bristles .	0,26–0,37 (0,32)	0,30–0,37 (0,35)	0,40–0,46 (0,43)	0,38–0,45 (0,41)
length of paramere .		0,54–0,59 (0,57)		0,56–0,59 (0,58)
base of genital segment . .		0,97–1,11 (1,05)		0,85–1,09 (0,98)
Total length: . .	5,36–6,28 (5,84)	5,48–6,59 (6,01)	5,12–6,42 (5,92)	6,09–6,54 (6,30)



Figs 2-5. Scanning Electron Micrographs of *Paracimex africanus* spec. nov., 2. Part of front femur, showing ctenidium ($\times 165$). 3. Part of middle femur, showing three ctenidial spines ($\times 367$). 4. Entrance to ectospermalege ($\times 362$). 5. Ventral view of male terminal segments ($\times 70$).

surrounding setae. The fluting on the surface of setae, when seen at high magnification, has the ridges convergent and fairly straight in the case of the ctenidial setae but parallel and spiralled in the case of the longer body setae. We regard *P. africanus* as being somewhat removed from the remaining members of the genus, but would expect this from its geographical and host associations and feel that no useful purpose would be served at this stage by attempting to create a new supraspecific category for its reception.

When *P. africanus* is applied to Usinger's (1966) artificial key to the species of the genus, it runs to *P. gerdheirichi* (Eichler). From the latter species it is easily distinguished by the reduced ctenidia of front and middle femora, the longer rostrum, the markedly serrate thoracic and abdominal setae, and by the form of the ectosperma-lege, which in *P. gerdheirichi* is reduced and trapezoidal in shape (Ueshima, 1968b).

P. gerdheirichi is associated with *Collocalia* swiftlets, and has been recorded from the Celebes. We do not believe that there are any true phylogenetic affinities between this species and *P. africanus*, and prefer to regard the new species as a relict of a previously wide distribution of *Paracimex* and Apodidae throughout the Ethiopian and Oriental Regions.

DISCUSSION

The first indication of Cimicidae parasitising birds in the Ethiopian Region was given by Steyn (1966) when he reported "bed bugs" from a nest of *T. aequatorialis* in Rhodesia. Despite enquiries by the senior author at the time, these specimens were not seen. In 1971 we received a complete nest from the same host and locality, and bugs were found in the laboratory examination which followed. In 1972 a nest of *T. melba* was collected in the Transvaal, and further specimens extracted in our laboratory. These three records constitute the only known occurrence of Cimicidae on birds in Africa south of the Sahara (not including the cosmopolitan bed bug, *Cimex lectularius*, for which we have records from chickens and pigeons for the region).

The senior author has visited the type locality of *P. africanus* in the Transvaal. This is a large granite outcrop rising from an arid plain and reaching an altitude of some 1 430 m a.s.l. Annual rainfall in the general area is around 388 mm, as given by Milstein (1973). The nests of *T. melba* are placed in a narrow cleft under an overhang, facing south and in continual shadow. On a ledge some 3 m below were nests of the Bald Ibis, *Geronticus calvus*. Milstein (1973) gives further information about the area.

The *T. aequatorialis* breeding site at Shotse Hill in the Matopos National Park is likewise a granite outcrop, and from the photograph in Steyn (1966) is very similar to the *T. melba* breeding site mentioned above.

Brooke (1967) has pointed out that the distribution of *T. melba* and *T. aequatorialis* is largely allopatric, and probably due to ecological competition. Regarding the classification of these two swifts, Brooke (1970) proposed to recognize *Tachymarptis* Roberts 1922 as a subgenus of *Apus*, on the grounds of absolutely greater size, and nesting habits. Later, with more information at his disposal, Brooke (1972) proposed to recognize *Tachymarptis* as a full genus in the Apodidae. This decision was based partly on the findings of Ledger (1971) that the lice *Dennyus vonarxi* Büttiker 1954 and *D. aequatorialis* Ledger 1968 (Phthiraptera: Menoponidae) of *T. melba* and *T. aequatorialis* respectively are closely related, but differ markedly from *Dennyus hirundinis* (Linnaeus, 1761) *sens. lat.* which had been seen from 11 forms of *Apus sens. str.* Furthermore, Brooke (1972) has pointed out that the foot in *T. melba* is pamprodactylous from hatching, whereas in the *Apus* species examined so far the birds are hatched with zygodacty-

lous feet which change to the pamprodactylous condition after about a week. Brooke (1972) says "The difference in foot formula at so early a stage in development strongly suggests a deep seated difference in the genetic systems of the two groups".

We submit that our discovery of *Paracimex* bugs associated with *T. aequatorialis* and *T. melba* is further supporting evidence that these two swifts are sufficiently different from members of *Apus sens. str.* to warrant recognition of the genus *Tachymarptis*.

ACKNOWLEDGEMENTS

We are grateful to Mr Richard Brooke of the Natal Museum, Durban and Mr Peter Milstein of the Transvaal Nature Conservation Division, Pretoria for discovering the material on which this paper is based and for entrusting it to us for study. Mr Ron Greasley of the Electron Microscope Department, University of the Witwatersrand, is thanked for the scanning electron micrographs. Dr Norihiro Ueshima of Matsusaka College, Mie, Japan, kindly commented on a manuscript of this paper. We thank Dr F. Zumpt and the Director of the South African Institute for Medical Research for advice and research facilities, and the South African Medical Research Council for a grant which enables us to work on the arthropod parasites of Vertebrates in Africa south of the Sahara.

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Manuscript received 3 May 1974.